

HOW BICYCLES ARE MADE.



VERY one certainly in this "tight little island" has seen a bicycle. There are many who have never seen a train, but I take it for granted that all at least in Great Britain who read this article have seen one, if not thousands of bicycles; for have not tourists on these iron steeds scoured through the most out-of-the-way parts where railways are not? Even the veriest country lad, living in any spot you could pitch upon from John O'Groat's

to Land's End, has seen the bicyclist gliding noiselessly by at the rate of ten to fifteen miles an hour, on a machine apparently so fragile that it is a wonder its spokes, as Old Scrooge said of the turkey's legs, "don't snap in two like bits of sealing-wax;" and undoubtedly they would, were it not for the peculiar hardening process which they undergo in the factory. Although every one has seen a bicycle, few, I should say, have seen them made. Manufacturers of these articles are not at all inclined to allow strangers to inspect their premises even if they have the opportunity, and it was only on special business that I managed to inspect several of these factories, after first obtaining permission in the offices from "the powers that be."

It is an old adage that "birds of a feather flock together," and bicycles and tricycles certainly form no exception to this rule, for their manufactories flock together very thickly at Coventry and a few other towns. Why the bicycle, and indeed tricycle, should have chosen the city of Godiva and the three spires as the chief seat of their manufacture, is as much a puzzle to me as was the adage I have just quoted to Lord Dundreary, and I must use his words and say it is "one of those things no fellah can understand." Coventry, we were taught at school, was noted for ribbons, lace, and watches. What affinity can bicycles have to either of these articles? One would have thought that Birmingham with its plant, skilled labour, and materials would have been the town from which we might expect to get these iron steeds. But no, bicycles would not be swallowed up as it were amongst the many other manufactures of that town, they would have a place pretty much to themselves, so they chose the ancient, legendary, and cleanly city of Coventry. In this city are some twenty or thirty manufacturers, who make the best quality bicycles. In Wolverhampton, one of the busiest, dirtiest, and dustiest of towns, are also to be found about twenty manufacturers of these articles. The cheapest and commonest class of machines are made in this town. There are also a few manufacturers of these articles in Birmingham,

London, Nottingham, Sheffield, and a few other places. In the former many of the "parts" are made and sold to manufacturers in other towns, who simply fit them together, but nevertheless style themselves "manufacturers."

In describing the process of manufacture of a bicycle I shall necessarily have to use many technical terms, such as "head," "bearings," "spindle," "hub," "neck," "fork," &c. If my reader be of the male sex, the chances are that he will understand them as well as myself; but if it be you, young lady (no matter what be your age, for you always like to be called young) who scan this page, I fear you will find it necessary to ask your brother, or husband, a few questions to enable you to understand every technical term. But I will be as plain as I can.

The iron of which most parts of the bicycle are made is received from the North of England in long square bars about two inches thick, and four or five yards long. This is then taken into what in large factories is called the "stamping shop." The stamp or die is a large solid block of well-wrought iron, some two or three feet square, on which has been hollowed out, by a chisel and other instruments, an exact shape of a part or "fitting" of a bicycle. In this shop are generally about four or five furnaces, pretty much the same as you would see in any village smithy. There is no "spreading chestnut-tree" overhead, or anything pleasant to relieve the grim spectacle this "shop" presents to one unaccustomed to such sights. A dozen or so young stripped Vulcans are busily at work. They make these bars of iron red-hot, then place the end of the bar on the die or stamp, when a block of iron worked by the foot, called a "hammer," is allowed to descend with great force on the red-hot bar, which instantly receives from the die or stamp its form as clearly as any jelly from a pastrycook's mould; a pair of huge shears severs the stamped part from the other portion of the bar, and there falls to the ground the rough part of a bicycle; it may be a "head," a "neck," "spindle," "hub," or "bearing," for these and many more are made in the same way. During this operation the parts are constantly soused in tanks containing either water or a mixture of water and oil, which has the effect of making them much tougher and harder.

These parts, having now received their form, are when cool taken by lads into what is usually known as the "press shop." Here they are relieved of any superfluous metal they may have considered they had a right to take with them, by being forced through a press which has sharp-edged knives, shaped so as to leave an aperture between them, the exact size and form of the part or fitting forced through it. There are necessarily different-shaped knives for every part of a bicycle that is made by the "stamping" process. Next they are favoured with a few revolutions of an emery wheel, which now takes the place of filing and makes them smooth and bright. These pieces are now

finished and are ready to fit up with the other parts. The "forks," or the two long pieces of metal which run from the centre of the big wheel (the flanges) and into the head of the machine and support most of the weight of the rider, are made of two pieces of steel cut to the required shape, or if hollow, as in some superior machines, they are simply two pieces of round tube bent partially flat and polished smooth on a grindstone. The "flanges," or the parts into which the spokes go, are cut by hand, while some of the most delicate parts of the bicycle are turned, planed, and cut by most precise and costly machinery.

All the parts are finally polished by men on rapidly revolving wheels that have leather surfaces on which has been spread a mixture of glue and emery. A very few revolutions of this wheel will give to any steel parts, or "fittings" as they are called in the trade, a polish that will reflect your face if you look at them almost as well as a mirror. The "rims" or frames of the wheel are bought from iron-founders in the North of England, in strips about half a dozen yards long, and when cut into the required lengths are bent round by a machine into a circle.

The parts thus made separately are now all fitted together, the last operation being the gluing on of the rubber tyres with cement. There are several kinds of cement used, indeed some manufacturers who make their own, keep the recipe of its preparation a secret, but the majority use Rockhill's cement, a preparation made chiefly of gas-tar. The best brands of iron are used in good bicycles, such as "low moor," "best gun,"

&c. In all the largest manufactories steam-power is, of course, used.

While writing of bicycles I cannot well conclude without referring to the steam-tricycle. A few months since, any one could not walk the streets of London without seeing in glaring red letters the advertisement on all the omnibuses, "Go and see the steam-tricycle." I went one morning early and found the inventor, Sir Thomas Parkyns, alone in the gallery of the Agricultural Hall. He was silently contemplating his machine and enjoying the soothing weed. I entered into conversation with him, and learnt that once again "necessity was the mother of invention." Sir Thomas, like most people, has a "hobby," and that is photography. He invented the steam-tricycle to carry himself and photographic apparatus "far from the madding crowd," where at every bend of the road or lane would be some natural picture worthy of the photographer's art. The machine is so constructed that it will travel about twenty miles an hour, and makes neither noise nor smell. It burns about a pennyworth of spirit a day, and condenses its waste steam into water and pumps the same into the boiler again. It is a clever invention and may become in the future of great value to many who travel, whether for business or pleasure. But as yet lawyers have to decide whether or not it shall be legal to ride it in the public road, for as the law now stands it is necessary for the rider to travel not faster than four miles an hour, and to be preceded by a man carrying a red flag as though he were a steam-roller.

GARDENING IN SEPTEMBER.



THOUGH the month upon which we have just entered must undeniably be called the last of our summer season, yet it is very often, in the earliest half of it at least—certainly it was so last year—the best, and at times the warmest and most enjoyable, of any in the year. We gardeners have latterly taken a leaf out of the farmer's book, and indulged in an occasional grumble, but towards the close of our complaints we generally brighten up in the expression of a hope that we are gradually returning to our old-fashioned seasons—seasons, that is, of longer and more uniformly warm summers, and of winters a little less Arctic-like than they have been of

late. As the year, however, begins to wear away, we cannot conceal our anxiety as to the future of our shrubberies, for example, for experience has taught us latterly that evergreens, which from time immemorial we had been wont to regard as sufficiently hardy to stand the English Christmas, may, if the winters of 1879 and 1880 are to be repeated, very likely disappear almost entirely. We must not, however, take too desponding a view of the matter on the one hand, nor must we on the other anticipate what we may have to say on this subject next month, which is generally the first month for alterations in the garden on a large scale, and a time also for considering the best method for protection against a possibly severe winter.

As yet, however, on this bright September morning—on, that is, we will suppose, one of these days in its first and therefore its better half—our flower-beds are all ablaze with scarlet geranium, China aster, verbena, phlox in its coloured vanity, and the bright and showy *calceolaria*, while our dahlia exhibition is doubtless in full force.

Of course, one of the very first operations this month, if we have not indeed already accomplished it, is the thorough completion of our stock of cuttings for the next season. By a little ingenuity we can so contrive